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A  
New Method of Operating  
FOR THE  
*FEMORAL HERNIA, &c.*

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[Price Two Shillings and Sixpence.]

*Lately published*

By THOMAS BEDDOES, M. D.

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A  
New Method of Operating

FOR THE

*FEMORAL HERNIA,*

TRANSLATED FROM THE SPANISH OF

DON ANTONIO DE GIMBERNAT,

*SURGEON TO THE KING OF SPAIN.*

WITH PLATES.

TO WHICH ARE ADDED

By the TRANSLATOR,

QUERIES RESPECTING A SAFER METHOD OF PERFORMING  
INOCULATION; AND THE TREATMENT OF  
CERTAIN FEVERS.

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L O N D O N:

Printed for J. JOHNSON, St. Paul's Church-Yard.

M,DCC,XCV.





## ADVERTISEMENT.

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*THE superiority of Mr. Gimbernat's method of operating for the femoral or crural hernia will not, I believe, be contested. The difference, indeed, appears to me to be exactly this; the patient who is treated according to Mr. Gimbernat's method will infallibly recover; whereas former modes of operating are well known to have been attended with the utmost danger.*

*This was a sufficient motive for undertaking to translate the following tract. I wish my translation may raise some curiosity in our surgeons with regard to the publications of their brethren abroad. Englishmen in general are disposed to undervalue the productions of foreigners; and among surgeons this propensity has, I think, been lately*

*lately strengthened by the example of one ignorant man of superior genius.*

*What I have added, I give as mere conjecture; should persons who have the opportunity think my conjectures worth putting to trial, some useful knowledge may possibly be acquired. Had I myself had any sufficient opportunity of trying what I have proposed on the subject of the small-pox, I should not have offered my observations to the public in their present crude state.*

T. B.

Clifton, June 26, 1795.

AN  
ACCOUNT  
OF  
FORMER METHODS OF  
OPERATING

FOR THE  
*CRURAL HERNIA,*

AND OF THE  
INCONVENIENCES WITH WHICH THEY  
WERE ATTENDED.

OF all complaints the true hernia is doubtless the most frequent. On careful calculation it has been found that one eighth part of the human species is afflicted with it. (*Arnaud in his preface* p. 100.) The majority of infants become ruptured;\* and many are born so. Some of those that are

\* This, it must be remembered, was written in Spain, where the pernicious practice of swaddling and tight cloathing is not yet exploded.—T.

B

cured

cured in infancy, (as almost all will be if properly treated) relapse, if not in the prime of life, at least in old age, when original hernias are extremely common.

The number of those that die of this complaint is not inconsiderable, and most of those who have ruptures, are incapable of performing certain functions of great importance to the state; and they generally lead a precarious and valetudinary life. This accident having at all times been so common and dangerous, it is difficult to say, why the treatment of it should have remained so long in the hands of persons without education, and without the smallest acquaintance either with the human body, or the disorder they attempted to remedy. It is only in the present century, that well-informed practitioners have applied themselves to this despised part of surgery; hence the abominable herd of *Gelders* and *Rupture Doc-*

*tors* has insensibly disappeared; and surgeons have acquired distinguished honor by the discovery of various new species of hernia, and of safe methods of curing them radically.

These improvements are entitled to our warmest approbation. It must nevertheless be acknowledged, that this branch of surgery has by no means attained the desirable degree of perfection. The principal defect lies in the mode of operation, and practitioners are still embarrassed to operate with safety in cases of the crural or femoral hernia, which presents some of the most dangerous cases.

Some, after the herniary sack is opened, advise to cut the fallopian ligament across and forwards; others to cut it outwards, or inwards. Mr. Arnaud, to avoid the danger of those methods, invented a blunt hook or curved levator, with which he made an assistant raise the ligament so as to dilate it, till there was room to return



the intestine into the abdomen; a method which may have much assisted Mr. Leblanc in the invention of his famous dilator, though he himself assures us, that he borrowed the hint from Lecat's method of gradually dilating the neck of the bladder in the operation for the stone.

The method invented by Leblanc in 1750, and since established by much practice, is doubtless preferable to all others in the inguinal hernia; at first view it appears so also in the crural hernia. When the structure however of the parts concerned in the crural hernia is carefully compared with Leblanc's method, it will be clearly seen that his dilator is not to be recommended. In the inguinal, the aperture which affords passage to the protruded parts, is formed by two aponeurotic bands, equally dilatable and having parallel fibres: so that were it not for an expansion of the fascia lata which unites  
firmly

firmly with the bands, and strengthens their junction, they would separate on the application of the slightest force, as far as the spine of the ilium. This disposition without doubt induced Mr. Leblanc to suppose, as others have supposed, that the extremity, which he calls *the handle of the ring*, (*l'anse de l'anneau*,) resembles in shape the handles of baskets, and that it consists of fibres, going off from the bands themselves and forming spirals round the handle. Hence they have compared this disposition of parts with that which they supposed to exist in the foramen of the diaphragm that gives passage to the vena cava. Anatomists however, who have well examined these apertures, know that there is not the smallest resemblance between them and the rim of a basket. If therefore the dilator of Leblanc be introduced into the inguinal ring, in such a manner that when

its sides are opened, they apply to the bands of the ring, the one will be parted from the other, more or less, according to their rigidity and to the force exerted; and in the same proportion will be stretched the fibres of the fascia lata that traverse the handle of the ring, whence a dilatation of the ring will inevitably result.

But in the crural hernia, the aperture through which the parts issue is *not* formed by two bands, but it is a foramen almost round, proceeding from the internal margin of the crural arch near its insertion in the branch of the os pubis, between this bone and the iliac vein: so that in this hernia, the branch of the os pubis is situated more internally than the intestine and a little behind; the vein externally and behind; and the internal border of the arch before. Now it is this border which always forms the strangulation, and this is the only part contributing  
to



to form the foramen, that can be extended without danger to the patient; the vein cannot; it might easily be ruptured; whence would arise an hæmorrhage, that would probably soon terminate with life. In case of strangulation it would be very dangerous to introduce into this foramen the dilator of Leblanc, on account of the pressure that must be made, on opening it, upon the great iliac vessels, notwithstanding the aponeurotic septum dividing the foramen from the passage for those vessels; neither could this instrument at all extend the internal margin of the arch, because it will be close to its insertion, and also because all its force is applied, not to its edge as would be necessary to its extension, but along it, since Leblanc always opens it with the canal of the gorget towards the intestine: in no other position indeed could it be opened, without sacrificing the strangulated intestine.

I shall be told perhaps, that Leblanc with his dilator raises the intestine a little upwards. But who does not perceive that this elevation is insufficient; besides, the instrument is very unfit for this purpose; to which it may be added, that if the edge or border, that produces the strangulation, were not prevented by its tension from being elevated sufficiently, the tenaculum of Arnaud would then be preferable. I will venture to assert, that in the cases of crural hernia, in which the dilator of Leblanc has been employed, fortunately for the patient, it never was introduced into the foramen; for the foramen was unknown, as also the duplicature of the crural arch that forms it. Hence Leblanc believed that the fallopian ligament, and cellular substance below, formed the strangulation of the intestine. (vide his *Operations of Surgery*, T. 11, p. 141. Paris, 1782.) “ The simple anatomical

“ mical description,” says he, “ of the  
 “ crural arch, beneath which pass the  
 “ parts that form the crural hernia,  
 “ shews that the dilatation may be effec-  
 “ ted there, still more easily than in the in-  
 “ guinal ring. This arch is principally  
 “ formed by a ligamentous and aponeu-  
 “ rotic band, which is stretched between  
 “ the anterior superior spine of the ilium  
 “ and the spine of the os pubis, in which  
 “ it is inserted, becoming narrower to  
 “ its insertion : it is called the fallopian  
 “ or inguinal ligament : beneath it is  
 “ cellular substance of considerable width,  
 “ which may be pressed sideways by the  
 “ slightest force. There are not, as  
 “ in the ring, any collateral fibres  
 “ which strengthen the aperture,  
 “ through which pass the parts that  
 “ form this hernia, hence this passage is  
 “ more easy. If we lift a little the nar-  
 “ rowest part of this band, with the  
 “ round

“ round part of the dilator, and make a  
 “ little pressure on the sides, the aperture  
 “ will be opened sufficiently to allow the  
 “ displaced parts to re-enter, as experi-  
 “ ence has shewn.

“ Experience and theory concur to  
 “ evince, that the dilatation proposed is  
 “ just as possible in the crural as in the  
 “ inguinal hernia ; and although Mr.  
 “ Arnaud considers the operation for the  
 “ latter as much more difficult and dan-  
 “ gerous ; observation has convinced me,  
 “ that according to my method, it does  
 “ not retain this character.” Such an im-  
 perfect description of the crural arch be-  
 trays the want of anatomical knowledge  
 of this part : and from the description it-  
 self we may deduce the inutility of the  
 dilator of Leblanc, in the last mentioned  
 operation ; for he himself confesses that if  
 the fallopian ligament be raised a little,  
 and slight lateral pressure be made on the  
 cellular



cellular texture below, the parts may be easily replaced. Can there be a stronger proof, that the dilator of Leblanc has never been introduced, in operations for the crural hernia, into the foramen, where the strangulation takes place? I am perfectly persuaded, that in all such cases, after the herniary sack has been opened, the parts could have been introduced by the hand alone; so that the introduction ought not to be attributed to the dilator.

Leblanc fell into a great mistake, in supposing that the cellular texture, and fallopian ligament, form the strangulation. That he entertained this opinion, appears from his being content with raising the fallopian ligament a little, and making a slight pressure on the cellular substance of the sides, parts which never occasion the strangulation; for this always depends on the inner edge of the  
crural

crural arch, of which Leblanc had no knowledge.

Leblanc was also mistaken in supposing that the gradual dilatation was more easily effected there, than in the inguinal ring, and in asserting in consequence, that the operation for the crural hernia was not more difficult, or dangerous, according to his method, than for the inguinal. Is it not evident from this, that Leblanc was unacquainted with the structure of the crural arch, and with the part that forms the strangulation? From what I have said, it follows that all the methods hitherto proposed, are either unnecessary, as that of Leblanc, (in which there is also great danger if the dilator be introduced, as was intended, into the foramen of strangulation) or else attended with great risk, as the best practitioners confess; since, if the fallopian ligament be cut across, the posterior pillar of the inguinal  
ring

ring is destroyed without remedy in both sexes, and in the male an important artery will always be cut.

This has been clearly shewn by Arnaud, who relates that, in consequence of a dispute on this point, an experiment was made in the Hotel Dieu, at Paris, in presence of three able anatomists, *Verdier, Ruffel, and Basseul*. The first subject they chose had a strangulated crural hernia, still subsisting, of which the patient had died. On this subject Mr. Baudou, first surgeon to the hospital, performed the operation in presence of the rest, with as much caution and dexterity as it is performed on the living subject. He cut the fallopian ligament across and forwards, and easily reduced the rupture. Mr. Ruffel, who could not believe that the spermatic artery would be divided in this method, dissected the part with the utmost care, and found the artery really divided.

That

That he might not be obliged to give up his opinion, he imputed this to some accident; he was, however, soon undeceived, when he repeated the operation in the same way on the other side of the subject. He found, notwithstanding the precaution with which he operated, that the spermatic artery was equally divided, though he performed the dissection with his own hand. This artery, when divided within the abdomen, occasions an hæmorrhage very difficult to stop; and even when we succeed in stopping it, the mischief in regard to the propagation of the species should be considered, if the vas deferens be divided, as is frequently the case.

Lastly, the patient is more than ever liable to relapses, because when the posterior pillar of the inguinal ring is cut, this forms with the crural ring a common aperture, large enough to give passage to

a con-



a considerable portion of intestine; the consequence therefore is a much larger hernia than before the operation, as actually happened to a woman on whom Mr. Arnaud operated in this way in 1727. He was prosecuted in consequence; and he himself confesses that if the judges had not been very intelligent, he must have been cast in damages and costs.

Cutting the fallopian ligament obliquely outwards, endangers still more the life of the patient, for the epigastric artery will be infallibly divided at its origin. An hæmorrhage extremely difficult, or rather impossible to stop, will be produced, yet no external signs of it will be seen, and the patient will die in a few minutes, to the surprise of the operator, till the cause of the unsuspected death, and at the same time the imperfection of this method, be detected by dissection. If the fallo-  
pian

pian ligament, as some have proposed, be cut obliquely inwards, the epigastric artery will be equally divided, though a little farther from its origin. The risk is the same; the only difference is that the death of the patient is not quite so immediate, and the chance of tying the artery is somewhat greater. Moreover, in all these methods the fallopian is cut, which is perfectly useless, unless the incision be carried on to the internal edge of the crural arch.

Arnaud, with a view to avoid all these dangers, invented, as I have mentioned, a blunt tenaculum, which I remember Dr. Hunter shewed to some of his pupils, and of which he spoke in his lectures with small recommendation. This tenaculum can only raise the external edge of the crural arch; it is not however, this, but the internal edge, which forms the strangulation and the instruments in question

can never reach the internal edge. We may therefore presume that in all the cases where Arnaud used his tenaculum, the reduction might have been effected by the hand alone after opening the herniary sack.

All practitioners have acknowledged the danger of this operation, although some writers very slightly observe by the by, that it is to be performed as for the inguinal hernia, an erroneous and most dangerous direction, which may be found in Garangeot and Sharp. Arnaud, Pott, and Bertrandi, however, expressly avow the difficulty and risk attending all the methods proposed to their time, and without venturing to decide which deserves the preference, they only recommend extreme caution to the operator. Dr. Hunter did the same in 1777, when I attended his lectures, without determin-

C .ing

ing any thing as to the merit of the respective methods.

Lastly, Mr. Bell has spoken of the operation in the following terms.

“ The membrana adiposa, tendinous  
 “ expansion of the fascia lata, and her-  
 “ nial sack, being all cautiously divided,  
 “ if the protruded parts are found in a  
 “ situation proper for reduction, we  
 “ should immediately attempt to replace  
 “ them ; and as the space below the li-  
 “ gament through which they have pas-  
 “ sed is considerable, this may frequent-  
 “ ly be done without dividing the liga-  
 “ ment, merely by pressure properly ap-  
 “ plied with the hand, while the pa-  
 “ tient’s body is placed in the posture we  
 “ have already directed in the bubono-  
 “ cele, as being best suited for favour-  
 “ ing a return of the bowels.

“ When in this manner the contents  
 “ of the tumor can be reduced without  
 “ the

“ the necessity of dividing the ligament,  
 “ the patient is thereby saved from a  
 “ great deal of hazard, as from the par-  
 “ ticular situation of the spermatic ves-  
 “ sels, and epigastric artery, with respect  
 “ to this ligament, any cut made into the  
 “ substance of the latter runs a very  
 “ great risk of dividing one or other of  
 “ them.

“ The spermatic vessels, \* as they go  
 “ along to pass out at the opening in the  
 “ external oblique muscle, run nearly  
 “ upon the very edge or border of Pou-  
 “ part's ligament, almost through its  
 “ whole length, so that I consider it as  
 “ impossible to make a free division of  
 “ the ligament without cutting them  
 “ across.†

\* The spermatic vessels run more than an inch along the canal formed by the duplicature of the crural arch, before they pass out at the inguinal ring, and in this course they are joined by the vas deferens. G.

† The experiment in the Hotel Dieu is a proof of the utter impossibility of doing this. G.



“ We have been advised indeed by  
 “ some, in order to avoid wounding the  
 “ spermatic vessels, which they acknow-  
 “ ledge would certainly happen if the  
 “ incision should be carried directly up-  
 “ wards, to cut in an oblique direction  
 “ outwards. In this method they allow  
 “ that the epigastric artery, from the  
 “ course it usually takes, may very pro-  
 “ bably be divided. But the risk attend-  
 “ ing the division of that artery they do  
 “ not consider as of much importance;  
 “ and if the discharge of blood, occa-  
 “ sioned by any wound that may be  
 “ made in it, should happen to be con-  
 “ siderable, they speak of it as a very  
 “ easy matter to take it up with a needle  
 “ and ligature, and needles of various  
 “ shapes have been invented for this pur-  
 “ pose. Even in emaciated people,  
 “ however, it is a matter of much dif-  
 “ ficulty to reach the epigastric artery,  
 “ and

“ and in corpulent patients it will be  
 “ found altogether impossible to surround  
 “ it with a ligature ; so that the younger  
 “ part of the profession ought to be very  
 “ cautious in receiving the directions  
 “ usually given upon this subject.

“ On reading the remarks of the late  
 “ Mr. Sharp upon this point, to se-  
 “ cure the epigastric artery by means of  
 “ a ligature, one would expect to be the  
 “ easiest of all operations ; but the dif-  
 “ ficulty which in reality attends it is  
 “ such, as must convince every one who  
 “ has tried it, that Mr. Sharp himself  
 “ had never put it in practice.

“ But even although this accident of  
 “ wounding the epigastric artery could  
 “ be guarded against in the most easy  
 “ and effectual manner, yet I will ven-  
 “ ture to say, when a femoral hernia is  
 “ of any considerable size, the distention  
 “ of the ligament thereby produced must

“ bring the spermatic vessels so nearly on  
 “ a line with the under border of the  
 “ ligament, as to render it altogether im-  
 “ possible to divide the one without the  
 “ other ; and whoever will examine  
 “ these parts in the state we have now  
 “ described, will see that this cannot be  
 “ avoided, whether the incision be car-  
 “ ried directly upwards, or even oblique-  
 “ ly outwards or inwards.

“ Some authors, from being sensible of  
 “ the danger attending this part of the  
 “ operation, have proposed merely to di-  
 “ late the passage, instead of dividing the  
 “ ligament ; and Mr. Arnaud, a French  
 “ writer on this subject, delineates a curved  
 “ levator for the purpose of supporting the  
 “ ligament till the protruded parts are re-  
 “ duced. But as we are to suppose in  
 “ every case of strangulated hernia, that  
 “ the passage through which the parts  
 “ have fallen down, is already dilated to  
 nearly



“ nearly its utmost possible extent; in  
 “ such a situation to attempt a farther  
 “ dilatation without the assistance of the  
 “ knife, would seldom, it is probable,  
 “ be productive of any advantage.

“ A considerable time ago it occurred  
 “ to me, that in this part of the opera-  
 “ tion some assistance might be derived  
 “ from performing it in the following  
 “ manner, and having since had occasion  
 “ to make trial of it in one case where  
 “ it answered most effectually, I can  
 “ now therefore recommend it with some  
 “ certainty. Instead of dividing the  
 “ ligament in the ordinary way, I only  
 “ made an incision into part of its thick-  
 “ nefs. In order to protect the parts  
 “ below, I first insinuated the fore-finger  
 “ of my left hand \* between the gut and

\* An evident proof that the fallopian ligament, or external border of the crural arch, does not occasion the strangulation, as all writers have hitherto supposed. G.

“ the ligament ; and then with a com-  
 “ mon scalpel made a cut of about an  
 “ inch in length, beginning above, and  
 “ proceeding to the under border of the  
 “ ligament.

“ The first scratch with the scalpel  
 “ was very slight ; but by repeated  
 “ touches it was made to penetrate al-  
 “ most through the whole thickness of  
 “ the ligament, till at last a very thin  
 “ lamella only of it remained. The  
 “ finger being now withdrawn, the pro-  
 “ truded parts were returned with great  
 “ ease, the ligament at its weakened part,  
 “ yielding gradually as the necessary pres-  
 “ sure was applied for the reduction of  
 “ the intestines.

“ As in this manner the opening  
 “ may be enlarged to any necessary ex-  
 “ tent, and as the spermatic vessels, and  
 “ epigastric artery, are thus effectually  
 “ avoided, the operation for this species  
 “ of

“ of hernia may not only be done with  
 “ equal certainty, but with the same de-  
 “ gree of safety as for any other kind of  
 “ rupture. For by not penetrating with  
 “ the scalpel through the whole thick-  
 “ nefs of the ligament, under which these  
 “ blood-vessels lie;\* they are thereby  
 “ kept free from all kind of danger du-  
 “ ring this part of the operation; and  
 “ the pressure to be afterwards used for  
 “ the reduction of the protruded parts,  
 “ if done in an easy, gradual manner, as  
 “ it ought always to be, can never in-  
 “ jure them materially; as blood-vessels  
 “ of the size and strength of which these  
 “ are easily admit of a degree of exten-  
 “ sion, much more considerable than can  
 “ be here required.”

This author was perfectly well acquainted with the danger of dividing the

\* The crural vessels, not the spermatic and epigastric, lie below the ligament, as will be seen in the sequel. G.

fallopian ligament in any direction whatever, and with the difficulty of dilatation without incision. He was not, however, well acquainted with the duplicature of the crural arch, or with its attachment along the crest of the os pubis; neither had he any exact acquaintance with the foramen, which gives passage to the parts forming the crural hernia; consequently he could ill understand what part forms the strangulation. Had he known it, he would not have meddled with the fallopian ligament, not even with its edge, as he did, doubtless supposing, that this ligament forms the strangulation.

This able practitioner nevertheless discovered a method of operating without dividing the spermatic or epigastric vessels. He introduced his finger below the fallopian ligament, between this ligament and the intestine; an evident proof that there was no strangulation there: he then  
made

made a very superficial incision from above downwards into the thickest part of the ligament to its lower edge; and without cutting quite through it, he continued his incision about an inch. He would naturally rest the back of the scalpel upon his finger, which served as a guide to the instrument, and at the same time, as a defence to the intestine. The incision being continued for an inch, the operator would inevitably cut the internal edge of the crural arch. Now cutting this but for a few lines, gives sufficient room for the easy reduction of the parts, and there is no necessity to touch the ligament, as it never occasions the strangulation:

Considering the place and direction in which the internal edge is divided, we shall perceive that the epigastric vessels are much exposed in both sexes, and the spermatic vessels and vas deferens in the male.



male. I am persuaded, that an hand less dexterous and less in practice than Mr. Bell's, could not have avoided dividing them; and as there is left only a thin lamina between the edge of the instrument and the vessels above mentioned, I will venture to affirm, that he will not be equally successful in all the cases in which he shall follow this method. Although, therefore, the internal edge of the crural arch will be cut, I would earnestly dissuade from this mode of operating, on account of the imminent danger attending it.

*Evidence in favour of the Author's method.*

I should not propose my new method with so much confidence, if I had not in its favour the successful event of two cases, in which I practised it in Barcelona in 1772 and 1773. My patients were female. I regret that my travels have  
prevented

prevented me from accumulating more facts. Professor Torner, however, of Barcelona, who was present at both my operations, has communicated to me two other cases, in which he followed the same method. One of his patients was a male, aged 54. The operation was performed on the 5th of June 1786, and by the 16th of the next month, complete recovery had taken place. The other was a nun 68 years of age; the operation was performed on the 23d of August 1788, and the patient was well by the 4th of October. Both these persons are still living. The nun has not been troubled with any hernia since, though she has worn no truss. The man wanted nothing of this kind for a twelvemonth; he then met with a violent accident, and had an hernia in the same place. Besides these four successful cases, I am encouraged to make my method public, by the  
decided

decided approbation it received from Dr. Hunter, to whom I explained it on a preparation in 1777. As it is, in my opinion, free from all the dangers that have been pointed out, and perfectly easy to practice, I cannot but flatter myself, that every surgeon who puts it to trial, will find it preferable to any hitherto proposed.

Its safety and success entirely depending on a perfect knowledge of the part where the accident takes place, I am under the necessity of premising an exact description of the crural arch.

This part, although it is so remarkable, had been little examined, and less understood by anatomists, till I demonstrated it for the first time in 1768. The ignorance of its true structure has occasioned such a variety of dangerous methods; and this is in reality, the reason why surgery has not made the smallest



progress in the treatment of this accident.

*Description of the Crural Arch.*

In the lower part of the abdomen, the external oblique muscle forms a strong and broad aponeurosis. The fibres are parallel; they descend obliquely from without inwards; and the lower extend from the superior anterior spine of the ilium, to the os pubis, at a little distance from which they open into two bands, or pillars, to form the inguinal ring. In all this tract, the aponeurosis forms a duplicature inwards. This duplicature, which is more manifest towards the os pubis, constitutes a strong whitish cord, which Fallopius supposed to be a ligament; and so it was called, till of late, when it received the name of crural arch, because at the top of the thigh, it has some distant resemblance to an arch or vault. This aponeurotic dupli-

duplication in its inside forms a canal, which is larger towards the os pubis, and lodges the spermatic vessels. These vessels run for a certain space through the canal, before they traverse the inguinal ring, where the canal terminates.

Between the ilium and os pubis, the arch is kept sufficiently tense by an expansion of the fascia lata, which unites intimately with it in its whole length, in such a manner, that if the expansion be cut, the arch is considerably relaxed. In the natural state, the tendons of the psoas and iliac muscles pass beneath it, as also the great crural vessels, and the lymphatic coming from the lower extremity. In the diseased state, some of the parts contained in the abdomen also pass, and form a tumor at the lower part of the groin. This is what is called a crural hernia.

This

This arch offers to our consideration some peculiar contrivances, little or not at all understood, though the knowledge be absolutely necessary to a perfect idea of the crural hernia, and to the safe operation for its cure. When the inferior band separates from the superior to form the inguinal ring, it goes to insert itself in a tubercle of the os pubis, which has been denominated its spine, and which gives origin to the crest of the superior branch of this bone, and is a continuation of the linea ileo-pectinea; moreover this pillar is not only inserted into the spine by a considerable union of aponeurotical fibres, but the duplicature of the arch being much greater there, it is continued inwards along the crest of the pubis, by means of a remarkable plait or duplicature, consisting of a portion of the aponeurosis. The particular disposition of this duplicature, extending from below upwards, and its inser-

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tion

tion from the spine to the end of the crest, which makes more than an inch in some subjects, is highly worthy of our consideration; for without it, we should all probably suffer large and dangerous protrusions of the contents of the abdomen. In consequence of this structure, the crural arch has two edges; one external, rounded like a cord, thicker towards the pubis, and resembling a ligament, as Fallopius actually denominated it; to this adheres the expansion of the fascia lata: in emaciated persons, the direction and tension of this cord may be felt through the integuments. The other edge, which I have called internal, is the termination of the edge of the aponeurosis; it is very thin, and from its origin unites intimately with the aponeurosis that covers the iliac muscle. This strict union, and that of the fascia lata with the external edge, are most perceptible from the anterior superior



rior spine of the ilium to the neighbourhood of the crural vessels ; hence the crural arch is more flattened and fixed down in all this course on the iliac muscle, serving it as a band to keep it in its place during its contractions ; consequently it is impossible that a crural hernia can ever take place in this tract, as some have supposed.

As soon as this intertexture of aponeurosis reaches the great secondary external iliac artery, there is detached from the internal edge of the crural arch a membranous expansion (which is strengthened by the tendon of the small psoas' muscle, when this muscle exists,) and insinuates itself behind the great secondary external iliac artery and vein. This expansion goes to be inserted close to the external edge of the pectineus muscle : moreover, one lamina from it passes over that muscle, and is attached to the crest of



the branch of the os pubis, where it is united with the duplicature of the arch which terminates in the same crest. By this union is formed a species of ligament which passes along the crest, below which the superior extremity of the pectineus muscle is inserted.

From this division of the crural arch there arises an aponeurotic sheath at the top of the thigh; it begins at the crural arch itself, close to the os pubis; so that the expansion, which has been described as sent from the internal edge of the arch, and passing behind the iliac vessels, forms the posterior part of the sheath, while the anterior is formed by the external edge of the fascia lata.

The iliac vessels, enveloped in the cellular substance of the peritonæum, enter into this sheath in their passage out of the abdomen; there are likewise some glands and lymphatics in it; but the crural nerve  
always

always passes without the sheath towards its external and posterior part.

The iliac artery and vein, before they enter into the sheath, send off the epigastric vessels by its anterior part: these vessels pass obliquely inwards, between the crural arch and spermatic vessels, which they appear to embrace on their entrance into the canal of the arch. From the external lateral parts of the iliac vessels, after their entrance into the sheath, are sent off the small inferior iliac branches, which take their course towards the spine of the ilium, close to the insertion of the oblique internal and transverse muscles, in the bottom of the duplicature of the crural arch.

In the internal lateral parts of the sheath close to the branch of the os pubis, precisely where the insertion of the duplicature of the arch ends, and on the inside of the great secondary iliac vein, there is

left a foramen sufficiently distinct, almost round, at which many lymphatics enter. A lymphatic gland is sometimes fitted into this foramen, and the parts which form the crural hernia always pass through it, consequently we may properly call it the *crural ring*. A single gland placed in this ring would prevent the issue of the parts contained in the abdomen ; but if a portion of the intestine should slide behind, so as to get out of the cavity, it would be very difficult to distinguish the hernia at first. A surgeon not acquainted with the structure would be much embarrassed if he were to attempt the operation.

The great iliac vessels occupy the principal portion of the orifice of the sheath ; the spermatic vessels close a little of the external side before they enter the canal of the arch. The epigastric vessels, in their way to the musculus rectus, cover it sufficiently

ciently in its anterior and internal part. Lastly, some aponeurotic fibres turn in from the internal edge of the arch; and a few lymphatic glands assist in stopping it compleatly, so that it is very difficult for the parts contained in the abdomen to make their way out, except through the crural ring.

If the particular structure of the crural arch and its tension as kept up by the expansion of the fascia lata be considered, we shall clearly see the reason why the crural seldom obtains so great a bulk as the inguinal hernia. We shall likewise see why the tumor is regularly round, hard, and slippery; a circumstance that causes much hesitation and even mistakes in practitioners of small experience. We shall also perceive why the operation is more dangerous, and reduction without operation more difficult: This difficulty has laid practitioners of the greatest credit



under the necessity of performing an operation which they dreaded, because they did not know how to steer beside the dangers that threatened the patient's life. To understand the preceding description fully, see the two plates at the end of this tract.

Before I proceed to explain the new method of operating without danger, it will be proper to remark that the symptoms of strangulation are the same in this hernia as in others, and that they are to be mitigated by the same means. These means belong rather to a complete treatise on hernias than to the present dissertation.

Nevertheless as the reduction ought to be repeatedly attempted before the operation is resolved upon, I shall lay down a few useful rules for effecting the reduction by the hand alone : from my experience and the particular structure of the  
parts,



parts, I think that this should not be attempted in the same manner as in other cases of hernia.

*Method of Reduction without Operation.*

The patient should be laid on the side opposite the hernia, with his body a little bent and somewhat lower than the pelvis ; the head should be inclined towards the breast ; the thigh on which the hernia is should be in a state of half flexion, so as not to be at all in the way of the operator. The operator should stand close by the bed, on the same side with the hernia : with the hand next the patient's abdomen, he should grasp the tumor at its base and upper part, and compressing it moderately on the side by his three foremost fingers, he should, at the same time, with the other hand push the lower end of the tumor upwards and inwards, to direct it towards the crural ring,

ring, for it cannot possibly be reduced by any other means. This attempt ought to be continued for a long time without intermission, provided the tumor is not inflamed; the force, in case it be necessary, should be gradually increased. But when the patient is fatigued, the compression and pushing should be discontinued, without losing hold of the tumor; which, on the contrary, should be firmly grasped, until the patient is refreshed and the reduction can be attempted anew. I have sometimes found above an hour necessary to effect this purpose; and I have reason to believe that I have been more successful than others, who, without attending to the above rules, have contented themselves with a slight attempt at reduction, for fear of injuring the intestine.

I can aver, that of numerous ruptures which I have treated in this manner, there  
have

have been very few which I have not been able to reduce ; and among these are some which have baffled other practitioners ; in none of these cases has any bad consequence followed. For although the compression and pushing have been long continued, and great force has sometimes been applied, it has always been gradually increased. The operator's nails put the patient to great inconvenience if he does not keep them cut close. I ought to add, that this method will be very injurious, if the tumor be inflamed and considerably painful ; and it will be still worse, if the violence of the symptoms announce inflammation in the intestine. In these circumstances the judicious practitioner will not harass the patient with ineffectual and perhaps fatal attempts at reduction by the hand, but will proceed directly to the operation.

*Method*

*Method of Operating.*

The patient being placed as for the operation of the inguinal hernia, and the hernial sac being properly laid open, an attempt should be made, if the intestine be uninjured, to replace it by the hand. For this purpose a little more of the intestine should be drawn out, because sometimes the incarcerated portion is so strongly contracted as not to allow passage to the matter contained in the part beyond. This is frequently the only impediment to reduction : it is generally to be overcome by bringing to the ring, if possible, a portion of the intestine that has remained in the abdomen. This not having suffered strangulation, will not be contracted like that which has suffered it for hours and days.

If the reduction cannot be effected in this way, it is absolutely necessary to divide

vide

vide the part that occasions the strangulations. For this purpose introduce, along the internal side of the intestine, a canulated or grooved sound, with a blunt end and a channel of sufficient depth. This is to be directed obliquely inwards, till it enter the crural ring, which will be known by the increased resistance ; as also when its point rests upon the branch of the os pubis. Then suspend the introduction ; and keeping the sound (with your left hand, if you are operating on the right side, and v. v.) firmly resting upon the branch of the os pubis, so that its back shall be turned towards the intestine and its canal to the symphysis pubis, introduce gently with your other hand into the groove of the sound a bistoury with a narrow blade and blunt end, till it enter the ring : its entry will be known as before by a little increase of resistance. Cautiously press the bistoury to the end of



the canal : and employing your two hands at once, carry both instruments close along the branch to the body of the pubis, drawing them out at the same time. By this easy operation you will divide the internal edge of the crural arch at its extremity ; and within four or five lines of its duplicature, the remainder continuing firmly attached by the inferior band or pillar, of which it is the continuation. This simple incision being thus made without the smallest danger, the internal border of the arch, which forms the strangulation, will be considerably relaxed, and the parts will be reduced with the greatest ease.

By this new method, the operation for the crural hernia, which the most celebrated surgeons have justly accounted extremely dangerous, is rendered the most simple and safe of all that are practised in cases of strangulated hernia.

The

The fallopian ligament is not at all concerned in this operation ; neither can the spermatic cord or spermatic artery, much less the epigastric, be divided, for all these parts are left at the shoulders of the sound, and far remote from the edge of the bistoury. The same may be said of the obturatrix artery, when it arises from the great secondary external iliac, though it passes over the branch of the pubis in its way to the foramen obturator. If by chance any of its small branches extend to the duplicature, they are so very minute that they carry with them no danger. I may say the same of another small anomalous artery, that occasionally ramifies through this part, since capillary vessels are never obstacles to operations of surgery.

The danger most to be dreaded, is that of wounding the urinary bladder, which would certainly be exposed, if it were  
full

full at the time of operation ; but it cannot possibly be wounded if empty. The precaution, therefore, of making the patient evacuate his urine a little before the operation, which was observed by Garangeot in such cases, must by no means be neglected.

In pregnancy of four months and upwards, the uterus may also be wounded. To avoid this injury, a bistoury, blunt at the end, is to be employed, like that which Arnaud used in the bubonocèle. Besides, we must take care not to introduce it far, and to have the patient greatly inclined to the opposite side.

After the operation, a simple dressing is to be used ; no extraneous body should be introduced into the incision ; on the contrary, care should be taken to bring the lips together, and to keep them so by means of some strips of adhesive plaster. Over this dry future let a simple compress

press be laid, slightly covered with an ointment made of white wax and good common oil, that it may not stick to the strips of plaister, or the lips of the wound. This compress should extend two inches beyond the future, to prevent the introduction of air, or any body capable of occasioning irritation. Upon the compress lay some lint, which should be kept in its place by other compresses, and a simple supporting bandage like the inguinal, which is commonly sufficient, or by the simple spica, if necessary. The patient is to be kept in the same position, as after the operation for the inguinal hernia; and he is to maintain equal quietness, and to observe the same diet. The first dressing, if nothing new occurs, is to be left on five or six days at least. Another is to be applied exactly like the former, and to be continued as long as possible; the dry future is to be employed,

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(unless another become absolutely necessary) in order to procure a speedy union. Should any thing unusual occur, the mode of treatment will of course be varied according to the circumstances.



*EXPLANATION of the PLATES.*

PLATE I, shews the pelvis vertically divided through its middle, with the two lowest lumbar vertebræ, one of the nates, and a portion of the thigh with its integuments. The interior part of this right half of the pelvis is shewn for greater distinctness.

1. The inferior ramus, or branch, of the os pubis.
2. The testicle.
3. Section of the corpus cavernosum.
4. Superior ramus, or branch, of the os pubis.
5. The symphysis pubis.
6. The duplicature of the crural arch, and its insertion in the crest of the os pubis.
7. The crural ring formed by this duplicature.
8. The epigastric vessels.
9. Part of the rectus muscle.
10. Aponeurosis of the abdominal muscles.
11. The vas deferens.
12. The spermatic vessels, enveloped in cellular substance.
13. Great secondary iliac vein.
14. Great secondary iliac artery.
15. Crural arch at its origin.
16. Section of the abdominal muscles.
17. The iliacus muscle.
18. The crest of the ilium.
19. The primary iliac artery on the left side.
20. The primary iliac vein.
21. The secondary internal iliac, or the epigastric artery,

PLATE II. The same side of the pelvis after the operation.

1. Superior branch of the os pubis.
2. Incision in the duplicature of the crural arch close to the crest of the os pubis, by which the crural ring is widened, and the internal margin of the arch is relaxed considerably.
3. Section of the abdominal muscles.
4. The epigastric vessels.
5. The crural arch.
6. The vas deferens.
7. The spermatic vessels.
8. The secondary iliac artery.
9. The secondary iliac vein.
10. Section of the primary iliac artery.

QUERIES

# Q U E R I E S

CONCERNING

## INOCULATION.

BY THE

T R A N S L A T O R.

**A**N opinion relative to the best method of performing inoculation, of which it is of great importance to ascertain the validity, has been lately advanced by Dr. George Fordyce. (See *Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge*. Johnson, 1793). According to Dr. Fordyce, the most essential circumstance in this operation, is to make a puncture exceedingly small, and so superficial that if no blood be drawn, the better. This direc-

tion is founded upon the supposition that the less matter is applied, the more mild will be the disease.

The evidence offered by the author in favour of this opinion, is nearly as follows. He inoculated three young ladies belonging to the same family, by three punctures each. One puncture suppurated before the two others, in one of these cases ; in the two other cases, the three punctures suppurated together. In these last, the disease was much more severe. Happening to inoculate a child with five punctures, he remarked that the disorder was very unfavourable. From these facts combined with the supposition, that when infection has taken place the subsequent application of matter has no effect, he deduced the opinion above. The author adds, that he has since inoculated a great number of persons by a very small puncture, and that he has not met with “one  
case

case in the smallest degree unfavourable." It might have been better perhaps, if Dr. Fordyce had assigned the number of patients on whom inoculation had been thus performed.

From the well-known experiments of Spallanzani, on artificial fecundation, it had occurred to me, that if it were advantageous to introduce a small quantity of variolous matter at the time of inoculation, this might be done by diluting the matter with water ; nor did it appear probable that its power of communicating the small-pox would be destroyed, even by a considerable quantity of water.

The paper of Dr. Fordyce revived this idea, and I communicated it to various practitioners, particularly of surgery, whom I had occasion to meet. I found two who had actually adopted the practice of dilution ; and both have obligingly per-



mitted me to communicate the result of their experience to the public.

*Letter from Mr. WAYTE, Surgeon,  
at Calne, in Wiltshire.*

*Calne, May 26, 1795.*

S I R,

I had the honour of receiving your letter of the 22d inst. and will faithfully answer your queries respecting the dilution of variolous matter, to the best of my observation. About three years ago, I was desired to inoculate some patients in a neighbouring village; I had only a small quantity of moist matter upon a bit of horn. When I arrived, I found about thirty people expecting to be inoculated, and fearing there might not be a sufficiency of fluid matter, I procured some cold water, and mixing it well with the flat side of the lancet upon the horn, inoculated

culated them all. They went through the disease so regularly and favourably, that it struck me that the disorder might be rendered milder by this method. An opportunity has since offered in our town to follow the same practice, viz. in September, 1793, when the poor of the parish were inoculated. I procured the matter from a woman at Bradford, nearly a goose-quill full. This matter being very viscid, was diluted, and divided between myself and two other gentlemen, who assisted in inoculating the poor. We inoculated six hundred and upwards, without any preparation; the diluted gave the disorder with the same certainty as pure matter; and all the patients recovered; a few had pretty full crops notwithstanding. Besides the poor, I inoculated about two hundred patients, who all recovered, except one child about five months old; this child had a red scorbutic

buteic humour all over it, but as it could not escape the disorder in the natural way, it was inoculated. When seized with the eruptive fever, it had a convulsion fit, after which petechiæ appeared, and it died before the eruption was complete. So that you will please to observe, that of eight hundred patients treated by this method, all recovered except this child. Now in inoculating a whole parish, we have no choice of patients, all ages, and the sickly as well as others, were inoculated; but these were mostly children, as I assisted in inoculating the whole parish, about twelve or thirteen years ago.

In answer to the particular heads of your enquiry. First, average degree of dilution? Equal parts of water and matter, sometimes a greater proportion of water. Secondly, number inoculated in this manner? At least eight hundred. Thirdly, deaths? One child of five months

months old. Fourthly, comparative mildness? The patients went through the disease without any irregular, or dangerous symptoms; generally a few distinct pustules appeared, which matured kindly; not more than five or six out of the whole number had pretty full crops, but those were distinct. Fifthly, my own observations? I have sometimes known troublesome abscesses form in the axilla, after inoculation, but I do not recollect one such instance after this practice, or any ill consequence to the health of the patients since; so that I cannot help thinking but the disorder may be rendered milder and less fatal by it.

I am,

Sir,

With great esteem, &c.

ALLEN WAYTE.

To Dr. BEDDOES.

*Letter*

*Letter from Mr. ROLPH, Surgeon, at  
Thornbury, in Gloucestershire.*

DEAR SIR,

Agreeably to your request, I send you a statement of some facts, which have occurred in the course of my practice, from the use of diluted variolous matter.

In the year 1793, I was called to inoculate several persons: two of the number had a confluent disease, and died; and some others had it in a violent degree. In these instances, recent matter was used.

From these unfortunate cases, I was led to conceive, that by a considerable dilution of the matter, the violence of the disease might be alleviated. I was not ignorant of the received opinion on this point, but convinced how very erroneous many received opinions are, I was determined



mined to put this to the test of experiment.

In the month of March, 1794, an opportunity offered itself. I was called to visit J. Price, who at that time was sickening of the small-pox, and on whom the eruption was just beginning to make its appearance. To prevent the contagion from spreading, the parish officers had Price removed to the house of a poor person, who, together with two children, was inoculated. The lancet I had by me was armed with variolous matter, taken in a very early stage of the complaint; this I largely diluted in a little warm water; when, on Sunday, 23d, (the day Price was removed) I proceeded to inoculation, making only one slight scratch through the scarf skin of each person.

On Tuesday, 25th, there was no appearance of infection; I therefore inoculated

lated them a second time, with the same lancet, and in a similar mode. Thursday, 27th, about noon there was no inflammation. Apprehensive now, of their receiving the disease in the natural way, I took some matter from Price, and again inoculated them, but in the other arm. The Sunday morning immediately following, the children having taken a purging medicine, complained of slight sickness, and in the evening of that day, the pustules made their appearance, few in number, and unaccompanied by fever: in the usual time they came to maturity.

I must not conceal, that the parts to which the undiluted matter had been applied were inflamed a little, the day after its insertion, which appearance continued to increase in a small degree, but no uneasiness was felt in the axilla at any time. Is it likely that the undiluted matter, applied on Thursday at noon, should  
 produce

produce an eruption the Sunday following? Or is it probable that two persons should take the disease in the natural way at the same time, and that the eruption in each should make its appearance in seven days, after exposure to contagion? Though there was not the least inflammation from the first, or second inoculation, yet every circumstance considered, I am induced to attribute the disease to the first. It may not be unnecessary to observe, that no person in the neighbourhood was then labouring under the disease, or had been for some time before. Price caught it whilst out on a journey. The man and children had not been in  
the

This question will, I suppose, be generally answered in the negative. In Dr. Haygarth's *Sketch*, there is a table, from which it appears, that out of eight hundred and thirty-three patients, inoculated at Newcastle and in London, not one had any commencement of the eruptive fever before the fifth day.

T. B.

small-pox is destroyed. Some advantage may probably in time be derived from this fact.

I remain yours,

With great respect,

T. ROLPH.

*June 10, 1795.*  
To Dr. BEDDOES.

It is pretty generally agreed, that infants, before the time of teething, ought by no means to be inoculated. Dr. Fordyce, in the paper already quoted, observes, that, “ Of the children who have  
“ died in London of inoculation for  
“ many years, as far as I have been able  
“ to collect, more than two thirds have  
“ been under nine months.” The want of that firm connection between the trains of motion, which is established by habit, is I imagine a much more general cause of mortality among inoculated infants than the symptoms arising from the protrusion of the teeth; these may and  
ought

ought to be mitigated by freely lancing the gums.

In some situations, however, inoculation of infants will be preferred as the smaller evil ; and in such emergencies, a method of performing the operation so as to produce a milder disease, is of unspeakable importance. For the reasons already adduced, I propose a trial of the following method. I have two objects in view : 1. To ensure the application of a small quantity of diluted matter ; and 2, to ensure a superficial wound. Should more ample experience shew *neither* of these circumstances to influence the degree of severity of the disease, there will not, I suppose, be any advantage in the method to compensate the small additional trouble it will occasion.

1. *Apply a blister of an extremely small size, not more than a very small fraction of an inch in diameter, over the insertion of the deltoid muscle. After the scarf skin*



*has risen and all pain has subsided, open the vesication, and let out the liquid.*

*2. Mix some variolous matter with ten or twenty times its bulk of water ; dip the point of a camel's hair pencil into the diluted matter, and touch the exposed skin as lightly as you can.*

Space and quantity must be determined by experience. From the analogy of some other animal fluids, it is probable that the addition of several hundred times its bulk of water would not destroy the power of the variolous matter.

I have mentioned the usual place, but it is possible that this may not be the most advantageous for the application of the matter. To some persons, the pain arising from the blister may occur as an objection ; but they will be persons who have never witnessed the severity of the inoculated small-pox in young infants, and the anxiety and injury to the health of the mother thence arising.

*Query*

*Query concerning Fever.*

From a singular, if not an unexam-  
 pled concurrence of testimony from va-  
 rious quarters of the world, we learn that  
 the use of quicksilver has been attended  
 by the most beneficial effects in certain  
 cases of fever. According to accounts  
 published by Dr. Clark, Dr. Wade, Mr.  
 Boag, Dr. Rush, and Dr. Chisholm,  
 this treatment has been far more successful  
 than any other of which we have infor-  
 mation.

Medical men, who believe that in  
 fevers of a certain kind, and particularly  
 of such a violence or malignity as those  
 which fell under the care of the authors  
 above mentioned, there occurs a putrid  
 dissolution of the blood, will revolt at the  
 idea of such practice. But the greater  
 number of physicians seem at present to be  
 persuaded that the term *putrid* was former-  
 ly used at random in medical reasonings ;  
 and

and why in fact should fetid perspiration or urine be regarded as the sign of a putrid state of the blood, any more than offensive breath ?

Such however is the baneful operation of false theory, that it produces an impression even on the minds of those who reject it. Hence we shall not yield our assent to the same evidence in behalf of quicksilver, as would produce full conviction with regard to the power of any other drug, that had never been *supposed* to increase the *supposed* putrefaction of the fluids.

Quicksilver would probably be of essential utility in many fevers, common in this country; and yet one cannot expect that it should soon have the trial to which it seems fairly entitled. We shall perhaps most speedily obtain the advantage it may afford, and prevent the sacrifice of many victims to prejudice, if we take pains to investigate the principle on which it operates.

rates. Its operation in syphilis has been much the subject of dispute. By some it has been supposed to destroy the syphilitic virus, existing in the body. Enquirers, more on their guard against first appearances and hasty conclusions, believe that quicksilver stimulates to a new mode of action, and so supersedes the effect of the contagious matter. May not its beneficial effect in fevers depend upon a principle different from either of these? Since in fevers the system continually passes from a state of torpor to a state of excitement, may not the increased action of the salivary glands tend to keep the whole body in a more equable state, and prevent the formation of fever-fits? Salivation is stated to be essential to the cure; and if future observation should establish the fact, will not my supposition be confirmed? Will salivation prevent the return of the fits of intermittents?

To

To evince the propriety of attending to new information on the subject of fever no laborious investigation is requisite. Simple inspection of the bills of mortality is sufficient. I do not expect that any person, acquainted with the uncertain efficacy of the other methods that have been hitherto recommended, will deny that the treatment by quicksilver is entitled to the most mature consideration.

The object in cases of fever being to excite speedy salivation, does not Mr. Clare's way of applying quicksilver promise to be the most advantageous?

In hydrocephalus internus, quicksilver is never, I believe, of service, unless salivation be brought on. At the period when physicians are often called in, this is a thing very difficult to be accomplished. Ought not therefore the same method of applying quicksilver to be tried in this disease?

THE END.





















